The Relationship Between Prenatal Economic Strain and Infant Irritability at 6 Months of Age

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Abstract

This study examined the association between prenatal economic strain and infant irritability at 6 months of age. A sample of 156 healthy mother-infant dyads were recruited as part of the Brain and Early Experience study. Prenatal visits were conducted as the first phase of this study during mother's third trimester, and home visits were conducted when infants were 6 months of age. Economic strain was assessed via maternal self-report at the prenatal visit. At the 6 month visit, trained research assistants assessed various aspects of the home environment, including household chaos and neighborhood safety as well as infant irritability. Results showed significant associations between economic strain and household chaos and neighborhood safety. Although in this study economic strain did not predict infant irritability, we found evidence of the proposed pathway that may link these two variables, and future studies with larger sample sizes should further examine this question.

Introduction

Studies have shown that the economic status of a family affects various child life outcomes. There are gaps in cognition, mobility, and both mental and physical health between children who grow up in low socioeconomic households and those who do not (Pollitt, 1994). Children exposed to poverty experience greater challenges that may affect their development across the entire lifespan. Little previous research shows how disparities in child outcomes can be detected as young as 6 months. While there is literature that observes how economic strain affects children's cognitive development, health, and behavior in childhood, there is space for observation of how economic strain during the prenatal period affects infants' irritability as early as 6 months and the mechanisms that may account for this association.

Poverty and Child Outcomes Theory

Economic strain is something that many families experience worldwide. One theory of poverty outlines the many detrimental effects of low-income living conditions on children's cognitive, socio-emotional, and behavior outcomes (Zigler, 1995). It is critical that we consider the direct implications of poverty on child development which carry throughout life and contribute to lifelong inequality. Zigler noted that infants who lived in low-income households performed lower in cognitive, behavioral and social outcome categories throughout development. Importantly, his research showed that despite the detrimental effects of poverty, once the gaps in development were identified, interventions could be implemented to combat these negative effects. This theory of poverty and child development has driven our research of how economic strain affects infant irritability.

Mechanisms and Model

Economic strain during pregnancy could be related to many mechanisms which may serve as a pathway to infant outcomes in the first year of life. Figure 1 proposes one pathway by which economic strain may impact child behavior.

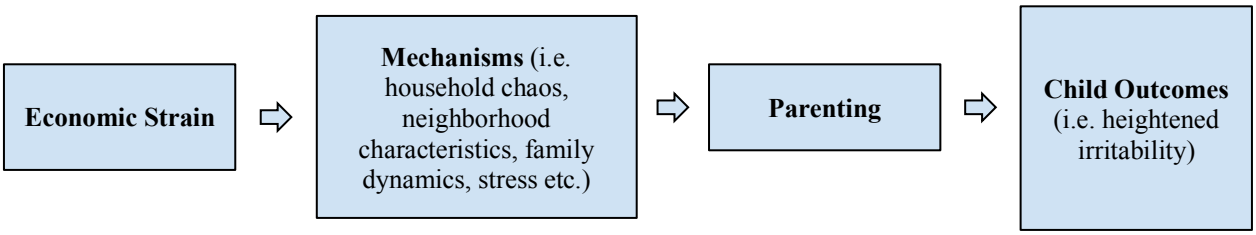

Figure 1: Proposed economic strain mechanism model

Research shows that it is not low socioeconomic status alone that predicts poor child outcomes, but rather various mechanisms that transmit the negative effects (Widom & Nikulina, 2012). Family stress and maternal well-being, two potential factors that are related to living in homes with high economic strain, are two mechanisms that have been studied previously. These mechanisms can explain inequalities in infant temperament between low and high SES families as young as 6 months (Jansen et al., 2008). Knowing that there are mechanisms by which financial problems can affect children helps to understand the breadth and importance of economic inequality. While this figure is relevant for children of all ages, the primary focus of this paper will be on those outcomes for 6-month-old infants. We will focus on two of these potential mechanisms: household chaos and neighborhood safety.

Household Chaos

Economic hardship has been associated with higher levels of chaos in the home. Chaos in a household with children affects the stability of the home environment and greatly affects child outcomes (Deater-Deckard et al., 2009). Heightened chaos affects child outcomes through mechanisms such as poor maternal mood, negative parenting, and increased stress. Lack of

stability, crowdedness, and over stimulation negatively affect inhibitory control, executive functioning and many other cognitive, behavioral and socio-emotional outcomes in children (Bridgett, Laake, & Oddi, 2013; Hardaway, Shaw, & Dishion, 2012). Additionally, Koblinsky and colleagues (2006) found families with stable routines have children with significantly more self-control and perform better on cognitive and behavioral measures. Few studies have examined the link between chaos and child affective outcomes, and even fewer studies have looked at this relationship among infants. We hypothesize that household chaos has the ability to affect infant mood.

Neighborhood Safety

Another factor that is associated with economic difficulties is the safety of the neighborhood. Much of childhood is spent in the neighborhood and safety concerns can negatively affect children physically (e.g. limiting outside play time), socially, and academically (Milam, Furr-Holden, & Leaf, 2010). Perceptions of neighborhood safety have been shown to influence health and behavioral outcomes for both adults and children. One study found that children living in neighborhoods that were less safe were more likely to have poorer sleep quality, asthma, participate in less physical activity, and experience heightened psychological distress (Côté-Lussier, Jackson, Kestens, Henderson, & Barnett, 2014). Previous studies that have researched the effects of neighborhood safety on children have primarily looked at adolescents and have not studied the effects of neighborhood safety on infants. We hypothesize that neighborhood safety may be one pathway that links economic strain to child outcomes and believe it is an important relationship to study.

Current Study

The current study fills a gap in the literature about the effects of economic strain on infant irritability. We ask the following questions: (1) Does higher economic strain predict more infant irritability? (2) What are the mechanisms that contribute to the link between economic strain and infant irritability? We hypothesize that these mechanisms are: (a) household chaos and (b) neighborhood safety. We plan to test all proposed relationships with correlations and regressions analyses. Economic strain was measured via maternal report during pregnancy and infant irritability was measured with a questionnaire completed by trained research assistants following a home visit at 6 months.

Methods

Procedures

Data came from the BEE (Brain and Early Experience) Study, a prospective and longitudinal study of mother-infant dyads (N = 156). Women were recruited during pregnancy from electronic medical records at UNC Hospital, social media (including Facebook), flyers, the Orange County WIC office, and from other local services that may include women during pregnancy (e.g. preschools, churches). Participants were seen in their third trimester of pregnancy at The University of North Carolina at Chapel Hill. During their prenatal visit, participants completed several computer tasks to assess memory, decision making, and attention. They completed interviews and several questionnaires, and provided bio samples of blood, saliva, hair and urine.

At six-months postpartum, a team of researchers went to the homes of participants and conducted another visit with both the mother and her infant ($N = 61$). At this visit, mothers completed computer tasks, interviews, and a series of questionnaires on the computer. Both

mothers and their infants completed various dyadic interaction tasks. Mothers also reported on various aspects of their infant's health, behavior, social-emotional, and cognitive development via questionnaires. For their participation, families were compensated $50 per visit and infants were provided with a small toy. Informed consent was obtained (for both mother and infant) at the start of the prenatal visit and the 6 month home visit, and all procedures were approved by an institutional review board. Participants could withdraw from the study at any point without penalty.

Participants

Participants were asked to provide their race and/or ethnic identity (White = 49.4%, Black or African American = 38.5%, American Indian, Alaskan Native, or Native Hawaiian .6%, Asian Indian = .6%, Chinese = .6%, Japanese = .6%, Korean = .6%, Vietnamese = .6%, Other Asian = .6%, Other = 7.1%, Biracial = 11.5%). Infants' race was considered to be the same as mother's reported race. Mothers ranged in age from 18 to 46 (M = 30.33) and some had less than a high school degree (1.9%), a high school degree (17.9%), some college (19.2%), an associate's degree (8.3%) to bachelors (20.5%), masters (18.6%) or PhD (11.5%).

Measures

The Economic Strain Questionnaire (prenatal). This questionnaire is a 6-item questionnaire that assessed the current level of financial stress experienced by mothers (see Appendix for full questionnaire.) This questionnaire asked both the degree to which paying bills was difficult, as well as her level of agreement with items stating that she felt she had enough money to afford the home, clothes, food, and medical care she needs. Items were summed to obtain a singular number representing economic strain. The composite variable representing economic strain was inversed so that higher scores indicated more financial strain.

Windshield Survey (6 months). This survey is completed by trained research assistants after completion of the 6 month home visit and is used to gather information about both household chaos and neighborhood safety. Items included to measure household chaos are: how clean was the home, the noise level around the neighborhood, how many hours the T.V. was on per day, and how many people total lived in the home. Each of these items were scored on a 4-point Likert scale and summed together such that higher scores indicated higher levels of overall *Household Chaos* (ranging from 0 to 32 (plus varying numbers of people living in the household)). *Neighborhood Safety* was assessed through a singular item on the windshield survey that required researchers to rate the safety of the neighborhood around the home. Scoring of this item was done on a 4-point Likert scale such that higher scores indicated more dangerous neighborhoods (ranging from 0 to 4).

The Infant Behavior Report (6 months) is an 11-item survey completed by two research assistants following the home visit. The average of the two assessments was used to obtain a single mean for each item. For this study, we were interested in the item that assessed infants' level of irritability. Researchers rated infant's irritability with the following scale.: 1 = *No irritability; infant passively responds to all stimulation*, 2 = *Between 1 and 3*, 3 = *Irritability to aversive stimulation, but control is maintained quickly*, 4 = *Between 3 and 5*, 5 = *Irritability to aversive and non-aversive stimulation leads to high intensity crying, but with consoling returns to lower states*, 6 = *Between 5 and 7,* 7 = *Irritable to most stimulation*, 8 = *Between 7 and 9*, 9 = *Irritable to all degrees of stimulation encountered throughout the home visit*. Higher scores on this scale indicated higher levels of irritability.

Results

The primary research question of interest focuses on the link between economic strain during pregnancy and infant irritability at 6 months of age. Hypothesized mechanisms that may lead to this association: (a) household chaos, and (b) neighborhood safety. Correlations and regression analyses are used to examine these links.

Descriptive Data

Means, standard deviations and Ns for all data are listed in Table 1. There is variation in sample size between prenatal data and 6 month data because not all 6 month visits are complete (data collection is still in progress). Due to the incomplete data, we expect results in this paper to be preliminary and results to become clearer as additional data is added and power increases. Additional missing data from both prenatal and 6 month data is the result of participants not completing all questionnaire items.

Correlations between primary study variables

Our overarching research goal was to examine relationships between parental economic strain and infant irritability at 6 months. First, we ran a series of bivariate correlations (see Table 2). The primary predictor of interest, economic strain, is a composite score of responses to the self-administered economic strain questionnaire (ESQ) and is normally distributed. Economic strain and infant irritability (measured by the IBR) were not significantly correlated. However, economic strain was significantly correlated with both chaos within the home and neighborhood safety. Correlations between infant irritability and household chaos were significant.

Multiple Linear Regressions

We conducted several regression analyses to examine our questions. Our first hypothesis focuses on the primary question; does prenatal economic strain predict infant irritability at 6 months. The second hypothesis breaks this down further and examines the potential links

between economic strain and possible mechanisms (i.e., household chaos, neighborhood safety). The third hypothesis focuses on the links between these potential mechanisms and infant irritability. In each model we controlled for variables including maternal education, age and race.

Hypothesis 1: Associations between economic strain and infant irritability

A multiple regression was carried out to investigate the primary question of whether economic strain significantly predicts infant irritability (see Table 3). The results of the regression were not significant, $F(4,52) = .126$, $p = .944$. In addition, mother's education did not significantly contribute to the model ($B = -.082$, $p = .311$), and neither did mother's race ($B = -.090$, $p = .345$) nor mother's age ($B = .024$, $p = .496$).

Hypothesis 2: Associations between economic strain, household chaos, and neighborhood safety

Multiple regression analyses were carried out to examine whether economic strain significantly predicts household chaos (see Table 4). The model was significant, $F(4,49) = 5.96$, $p = .001$. Mother's education significantly explained some of the variance ($B = -.681$, $p = .025$), but mother's race did not ($B = .069$, $p = .863$) and mother's age did not either ($B = .003$, $p = .985$). Even controlling for these three variables, economic strain remained significant ($B = 1.89$, $p = .044$). Next, a multiple regression was run to examine the association between economic strain and neighborhood safety (see Table 5). The model was significant, $F(4,52) = 7.73$, $p = .000$. Mother's education did not significantly contribute to the model ($B = -.031$, $p = .225$) and neither did mother's race ($B = .037$, $p = .212$) nor mother's age ($B = -.010$, $p = .359$). Economic strain was still the primary significant predictor ($B = .266$, $p = .001$).

Hypothesis 3: Associations between household chaos, neighborhood safety, and infant irritability

We conducted a regression analysis to examine whether household chaos significantly predicts infant irritability (see Table 3). The model trended towards significance, $F(4,46) = 2.23$,

p = .079. The primary predictor of household chaos was significant (B = .105, p = .008). Mother's education (B = -.153, p = .072), mother's race (B = -.070, p = .436), and mother's age (B = .019, p = .640) were not significant predictors. Finally, we conducted a regression to analyze if neighborhood safety predicts infant irritability (see Table 3). The model was not significant F(4,53) = .368, p = .830. Mother's education (B = -.061, p = .439), mother's race (B = -.085, p = .376), and mother's age (B = .020, p = .571) were not significant predictors for this model either.

Discussion

This study examined the relationship between prenatal economic strain and infant irritability at 6 months of age and explored potential mechanisms that may explain this relationship. Overall, there was not a direct significant relationship between infant irritability and economic strain, however, there were significant associations between economic strain and proposed mechanisms such as household chaos and neighborhood safety, as well as between these mechanisms and infant irritability. The following discussion will summarize our findings and provide possible interpretations, limitations, and future directions of the research at hand.

For our first hypothesis, we expected a predictive relationship between prenatal economic strain and infant irritability at 6 months. We expected this to be the case because economic strain is a stressful experience that may lead to more negative or less sensitive parenting which directly affects children. No significant correlations or regressions were found after running analyses between these two variables. Much of the existing literature has observed children at later ages, but very few have observed infants (Jansen et al., 2008). Therefore, one possible explanation for this null result is that 6 months may be too young to observe a predictive relationship between economic strain and the infant outcomes which we were able to measure. At this age, it may be

that infants have not yet experienced the negative effects of living in a low-income home. Another reason we may have not seen a significant relationship is that irritability may not be the most appropriate outcome variable. Perhaps cognitive or health outcomes are affected by economic strain more than irritability at this age.

Alternatively, null findings could be the result of the 6 month outcome occurring too far from the prenatal predictor measurement. In the time between prenatal and 6 month measurement many things could happen that were not measured in the current study. Mother's financial situation may have improved between the prenatal and 6 month visits, thus in addition to the economic strain questionnaire prenatally, it would be beneficial in future studies to also use an economic strain measurement at the 6 month visit to determine if families are still struggling financially at 6 months postpartum. Even if economic strain is still present at 6 months, there may also be unobserved moderating variables helping to curtail negative effects of economic strain to infants. Moderating variables that may be present in our model are: social support after pregnancy, financial aid (e.g. government assistance, family assistance), and positive family dynamic or sensitive parenting behavior.

Although we did not find a direct, significant predictive relationship between economic status and infant irritability, there is literature demonstrating that economic strain does indeed affect child outcomes (Widom & Nikulina, 2012). Therefore, it is important to highlight the links within our mechanism model. The significant associations within our proposed model suggest that there are mechanisms by which economic strain may travel to affect infant irritability. Thus, our second question of interest was focused on the link between economic strain and two potential mechanisms that could be related to infant irritability; household chaos and neighborhood safety. We found that economic strain was significantly correlated with both

mechanisms. These relationships are similar to previous research, particularly the findings in Walker et al. (2006) and Côté-Lussier et al. (2014), two studies that laid the groundwork for the current study.

Finally, we examined whether these mechanism variables (household chaos and neighborhood safety) were significantly correlated with infant irritability. Consistent with Hur, Buettner, & Jeon (2015) we found that household chaos significantly predicted infant irritability, which means that this could be an important link within our proposed model. In other words, economic strain and household chaos were significantly correlated, and household chaos was significantly correlated with infant irritability. It is likely that women who have high levels of stress around their financial situation may have households that are more chaotic, and in turn, those chaotic homes may lead to infants displaying more irritability. This is critical because it suggests that a living environment that is too noisy, crowded, and/or messy could directly affect infants as early as infancy. Understanding irritability at such a young age is important because it could set the stage for emotional outcomes later in life (Coffey, Warren, & Gottfried, 2014). Future studies should examine this more closely and include additional measures in this model, including parenting behavior, which may link economic strain to infant outcomes (e.g., negative parenting due to stress).

Limitations

There are notable limitations to our study. One important limitation is the varying sample size between our two data collection times (i.e. prenatal and 6 month). Having equal numbers for both data collection points, or a larger final sample size, may have increased our power and yielded additional significant findings and perhaps pushed findings that were approaching

significance to reach significance. However, our findings are important preliminary work that will guide future studies.

An additional limitation to our study is that we used singular items, rather than a composite of items, from the IBR and windshield surveys to measure infant irritability and neighborhood safety. Composite scores, like the one used to measure household chaos, would have been a more thorough measure for these variables, and would have yielded the ability to capture more nuanced aspects of infant irritability and neighborhood safety.

Another important limitation is that we utilized a survey method, such that our study used self-report and observer-report only. More concrete observational measures would yield less biased results and more valid data. A better measure of infant behavior and affect would come from use of observational assessments such as the Still-Face Paradigm. This observational measure of infant behavior and affect would be a less biased measure of infant emotional outcomes for future research.

Future Research

Examination of the current topics will continue to build upon the theory that poverty has meaningful, detrimental effects on child life outcomes. With continued interest in this topic, we can better understand the various ways in which economic strain may affect infant and child outcomes. Future research on the topic should continue to explore the effects of economic insecurity on infants. Though the findings were not significant as predicted, the importance of the study and finding the links between potential mechanisms is an important step for this area of research. Furthermore, it would benefit future studies to employ a more observational measure of infant mood and behavior that would be more reliable and valid and perhaps lead to more conclusive findings. The current dataset will include observational measures such as the Still-

Face Paradigm and attention activities which will be used to replicate and extend these findings in the future. Finally, the lack of multiple significant findings for this study should encourage further research to explore other possible mechanisms that affect infant mood including protective factors that we were not able to consider, such as positive family dynamic, parenting behavior, and community support. These protective factors may buffer the negative effects of economic strain on infant irritability.

In closing, the topic at hand is important to continue to study and future studies should consider our results and limitations in forming new studies. Additional research should pave the way for the eventual study of interventions that may be implemented to curtail the many negative effects of economic strain on child development.

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Tables

Table 1. Descriptive Statistics

Measure	N	Mean	Std. Deviation	Min	Max
Demographics					
Maternal Age	151	30.334	5.544	18.739	46.168
Maternal Education	153	15.200	2.584	11	19
Maternal Race	152	1.180	2.378	0	9
Measures					
ESQ (prenatal)	149	1.600	.691	.666	3.833
Irritability (6 mos)	61	3.033	1.150	1.000	7.000
Household Chaos (6 mos)	54	10.740	4.902	5.000	32.000
Neighborhood Safety (6 mos)	61	1.582	4.902	1.000	2.500

Table 2. Correlations

Measure	ESQ	Irritability	Household Chaos	Neighborhood Safety	Maternal Age	Maternal Race	Maternal Education
1. ESQ	-	.013	.405**	.533**	-.098	.114	- .400**
2. Irritability		-	-.286*	.-.021	.065	-.107	-.054
3. Household Chaos			-	.437**	-.254	.142	-.470**
4. Neighborhood Safety				-	-.322*	.249	-.443**
5. Maternal Age					-	-.203*	.466**
6. Maternal Race						-	-.266**
7. Maternal Education							-

** Correlation is significant at the 0.01 level (1-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table 3. Regression Analysis for Prediction of Infant Irritability

Measure	B	Std. Error	β	*P*-value
Household Chaos				
Constant	6.168	1.530		.000
Household Chaos	.105	.038	-.435	.008*
Maternal Age	.019	.040	.075	.640
Maternal Race	-.070	.089	-.108	.436
Maternal Education	-.153	.083	-.329	.072
Neighborhood Safety				
Constant	3.423	1.610		038
Neighborhood Safety	.032	.401	.012	.937
Maternal Age	.020	.036	.090	.571
Maternal Race	-.085	.095	-.126	.376
Maternal Education	-.061	.078	-.131	.439
Economic Strain				
Constant	3.737	1.398		.010
Economic Strain	.021	.249	-.013	.934
Maternal Age	.024	.036	.109	.496
Maternal Race	-.090	.094	-.133	.345
Maternal Education	-.082	.080	-.175	.311

Table 4. Regression Analysis for Economic Strain Predicting Household Chaos

Measure	B	Std. Error	β	*P*-value
Constant	18.622	5.246		.001
Economic Strain	1.890	.912	.285	.044*
Maternal Age	.003	.146	.003	.985
Maternal Race	.069	.332	.027	.836
Maternal Education	-.681	.295	-.363	.026*

Table 5. Regression Analysis for ESQ Predicting Neighborhood Safety

Measure	B	Std. Error	β	*P*-value
Constant	1.929	.435		.000
Economic Strain	.266	.078	.417	.001*
Maternal Age	-.101	.011	-.119	.359
Maternal Race	.037	.029	.143	.212
Maternal Education	-.031	.025	-.170	.225

Appendix

Economic Strain Questionnaire

Please answer the following questions about money and monthly expenses.

#	Item	Great deal of difficulty	Quite a bit of difficulty	Some difficulty	A little difficulty	No difficulty at all
1	How difficult is it for you to pay your family's bills each month? **[ESQ1]**	0	1	2	3	4

#	Item	Not enough to make ends meet	Almost enough to make ends meet	Just enough to make ends meet	Some money left over	More than enough money left over
2	Generally, at the end of each month, do you end up with… **[ESQ2]**	0	1	2	3	4

Choose the response that says how much you agree or disagree with the following statements.

#	Item	Strongly disagree	Disagree	Agree	Strongly agree
3	My family has enough money to afford the kind of home we need. **[ESQ3]**	0	1	2	3
4	We have enough money to afford the kind of clothing we need **[ESQ4]**	0	1	2	3
5	We have enough money to afford the kind of food we need. **[ESQ5]**	0	1	2	3
6	We have enough money to afford the kind of medical care we need. **[ESQ6]**	0	1	2	3

***** NOTE: All computerized items have option "Choose not to answer" with a coded value of '9999'. *****

Windshield Survey

#	Item	Check
1	Family's preparation for session and organization of session. [**WNDS1**]	0 = Can't rate 1 = Surprise/Difficulty 2 = Aware but unprepared 3 = Aware/Ready 4 = Good Hosts
2	Primary Respondent's receptivity toward visitors. [**WNDS2**]	0 = Can't rate 1 = Very Uncomfortable 2 = Distant but Polite 3 = Average Friendliness 4 = Very warm
3	Secondary Respondent's receptivity toward visitors. [**WNDS3**]	0 = Can't rate 1 = Very Uncomfortable 2 = Distant but Polite 3 = Average Friendliness 4 = Very warm 5 = Not Applicable, no secondary respondent
4	How much difficulty did you have in completing this interview? [**WNDS4**]	0 = Can't rate 1 = Very Smooth 2 = Slight Difficulty 3 = Some Difficulty 4 = Great Difficulty
5	Do you have reason to doubt the validity of this interview and home visit? [**WNDS5**]	0 = Can't rate 1 = Probably Valid 2 = Respondent Responses Possibly Invalid 3 = Definitely Reasons to Doubt Validity
6	How clean is this dwelling? [**WNDS6**]	0 = Can't rate 1 = Very Dirty 2 = Slightly Dirty 3 = Messy 4 = Clean
7	How safe is the interior of this building? [**WNDS7**]	0 = Can't rate 1 = Obviously dangerous 2 = Slightly Dangerous 3 = Average 4 = Above Average Safety

8	How many rooms are in this dwelling? [**WNDS8**]	0 = Can't rate 1 = 1 or 2 2 = 3 or 4 3 = 5 or 6 4 = >6
9	How safe is the area outside of this building? [**WNDS9**]	0 = Can't rate 1 = Obviously dangerous 2 = Slightly Dangerous 3 = Average 4 = Above Average Safety
10	The street on which this dwelling is located is: [**WNDS10**]	0 = Can't rate 1 = Mainly residential 2 = Mixed Resid & Commercial 3 = Mostly Commercial 4 = Rural or Agricultural
11	The noise level in this neighborhood around this dwelling is: [**WNDS11**]	0 = Can't rate 1 = Very Quiet 2 = Average 3 = Noisy 4 = Very Noisy
12	The safety of the neighborhood around this dwelling is: [**WNDS12**]	0 = Can't rate 1 = Very Safe/Crime Free 2 = Average for This City 3 = Unsafe 4 = Very Unsafe/High Risk
	RA to Ask Mom Numbers 13,14,15	
13	How many hours is the TV on in the house per day? [**WNDS13**]	_____ (drop down box 0 to 24)
14	How many rooms are in the home? [**WNDS14**]	_____ (drop down box 0 to 20)
15	How many people total live in the home? [**WNDS15**]	_____ (drop down box 0 to 20)

[i] Items 6 9(rev), 11, 13, and 15 are summed for the measure of household chaos
[ii] Item 12 is used as the measure of neighborhood safety

Infant Behavior Record

#	Item	Check
1	Responsiveness to persons [**A1InfB1, A2InfB1**]	1 = Behavior towards persons is not differen from behavior towards objects. 2 = Between 1 and 3. 3 = Responds briefly to social approach but when not approached directly by persons do not attend to them. 4 = Between 3 and 5. 5 = Responds to social approach and persons present, but less than half the time. 6 = Between 5 and 7. 7 = Responds to social approach and continu interest in persons present. 8 = Between 7 and 9. 9 = Behavior seems to be continuously affected by awareness of persons present.
2	Responsiveness to examiner [**A1InfB2, A2InfB1**]	1 = Avoiding or withdrawn 2 = Hesitant 3 = Accepting 4 = Friendly 5 = Inviting (initiating, demanding)
3	Responsiveness to mother/caregiver [**A1InfB3, A2InfB3**]	1 = Avoiding or withdrawn 2 = Hesitant 3 = Accepting 4 = Friendly 5 = Inviting (initiating, demanding)
4	Reaction to the new or strange (e.g., strangers, strange surroundings, test materials) [**A1InfB4, A2InfB4**]	1 = Accepts the entire situation with no evidence of fear, caution or inhibition of actions. 2 = Between 1 and 3. 3 = Some slight vigilance, and restrained behavior in the first few minutes. 4 = Between 3 and 5. 5 = Behavior is affected by the new and strange, but just moderately and for approximately the first third of the home visi 6 =Between 5 and 7. 7 = Shows evidence of being bothered by the strange situation or persons much of the time 8 = Between 7 and 9. 9 = Strong indication of fear of the strange, to the extent that he cannot be brought to play or respond to the examiner or tasks.
5	Degree of happiness [**A1InfB5, A2InfB5**]	1 = Child seems unhappy throughout the home visit.

		2 = Between 1 and 3. 3 = At times rather unhappy, but may respon happily to interesting procedures. 4 = Between 3 and 5. 5 = Moderately happy or contented; may become upset, but recovers fairly easily. 6 = Between 5 and 7. 7 = Generally appears to be in a happy state of well-being. 8 = Between 7 and 9. 9 = Radiates happiness; nothing is upsetting; animated.
6	Responsiveness to objects; toys or test materials [**A1InfB6, A2InfB6**]	1 = Does not look at or in any way indicate interest in objects. 2 = Between 1 and 3. 3 = When given materials, glances at them and holds them briefly but does not explore them. 4 = Between 3 and 5. 5 = Plays with materials when presented; discards or loses interest in each after a brief reaction. 6 = Between 5 and 7. 7 = Sustained interest in the objects/test materials, in each new one in turn as presented. 8 = Between 7 and 9. 9 = Reluctantly relinquishes objects/test materials.
7	Tendency to persist in attending to any one object, person or activity, aside from attaining a goal [**A1InfB7, A2InfB7**]	1 = Fleeting attention span. 2 = Between 1 and 3. 3 = Attends to a toy, task or person, but is easily distracted. 4 = Between 3 and 5. 5 = Moderated attention to each new toy, person, or situation; soon ready for another. 6 = Between 5 and 7. 7 = Continues interest in persons, tasks or things for rather long periods. 8 = Between 7 and 9. 9 = Long-continued absorption in a toy, activity or person.
8	Behavior constancy in adequacy of response to demands of the home visit [**A1InfB8, A2InfB8**]	1 = Tires easily; quickly regresses to lower levels of functioning. 2 = Between 1 and 3.

		3 = Grows restless fairly soon and terminates the tasks. 4 = Between 3 and 5. 5 = Adequate tolerance for most of the tasks; only restless towards the end. 6 = Between 5 and 7. 7 = Holds up well throughout home visit. 8 = Between 7 and 9. 9 = Continues to respond well and with interest, even during prolonged tasks at difficult levels.
9	Amount of gross bodily movement [**A1InfB9, A2InfB9**]	1 = Stays quietly in one place, with practically no self-initiated movement. 2 = Between 1 and 3. 3 = Usually quiet and inactive but responds appropriately in situations calling for some activity. 4 = Between 3 and 5. 5 = Moderate activity; enters into games with freedom of action. 6 = Between 5 and 7. 7 = In action during much of the period of observation. 8 = Between 7 and 9. 9 = Hyperactive; cannot be quieted for sedentary tests.
10	The ease with which a child is stimulated to react in general; his SENSITIVITY or EXCITABILITY; reactivity may be positive or negative in tone [**A1InfB10, A2InfB10**]	1 = Unreactive; seems to pay little heed to what goes on around him; responds only to strong or repeated stimulation. 2 = Between 1 and 3. 3 = Some tendency to be unreactive to the changes in the environment (objects, tasks, etc.) 4 = Between 3 and 5. 5 = Moderately alert and responsive in reaction to what is happening in the environment. 6 = Between 5 and 7. 7 = Quickly shows awareness of changes in test materials and situations. 8 = Between 7 and 9. 9 = Very reactive; every little thing seems to stir him up; he startles, reacts quickly, seems keenly sensitive to things going on around him.

11	Irritability [**A1InfB11, A2InfB11**]	1 = No irritability; infant passively responds to all stimulation. 2 = Between 1 and 3. 3 = Irritability to aversive stimulation, but control is maintained quickly. 4 = Between 3 and 5. 5 = Irritability to aversive and non-aversive stimulation leads to high intensity crying, bu with consoling returns to lower states 6 = Between 5 and 7. 7 = Irritable to most stimulation. 8 = Between 7 and 9. 9 = Irritable to all degrees of stimulation encountered throughout the home visit.

[i] Item 11 is the measure of infant irritability used for the current study